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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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08/07/2001

Hidenori Kawata

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7590

09/07/2004

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EXAMINER

QI, ZHI QIANG

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 09/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/922,859

Applicant(s)

KAWATA, HIDENORI

Examiner

Mike Qi

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 5, 11-13 and 19-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-10, 14-18 and 32-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5/24/04; 10/10/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The withdrawn claims 16-17 have been added), and new claims 32-34 have been added.

Claim Objections

1. Claim 33 is objected to because of the following informalities:

Claim 33, recitation “. . . according claim 19, . . .”, however, the claim 19 has been withdrawn, that appears to be a typing mistake, and should be “. . .according to claim 32, . . .”. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 16, recitation “. . .forming a barrier layer by depositing a film of . . . upon said metal layer prior to forming the metal layer.” Is indefinite. Because the barrier layer is formed on the metal layer, so that how to form a barrier layer prior to form the metal layer. The metal layer must be formed before the barrier layer, since the metal layer as a base layer for forming the barrier layer.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3, 14-16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art (AAPA) in view of JP 4-1728 (Komori et al) and JP 9-311326 (Murata et al).

Claims 1, 14-16 and 18, AAPA discloses (paragraph 0004 – paragraph 0010; Fig.15) that an electro-optical apparatus comprising:
(concerning claims 1 and 18)

- a pair of substrates (10, 20);
- a liquid crystal (50) as an electro-optical material disposed between the pair of substrates (10,20);
- TFT (30) as a switching element disposed above one of the substrates (10);
- a light shielding film (11a) disposed at a location opposing the switching element (TFT 30), and the light shielding film (11a) made of a refractory metal compound such as WSi (tungsten silicide);

(concerning claim 14)

- an insulating substrate (10);

- a light shielding film (11a) disposed above the insulating substrate (10), and the light shielding film (11a) made of a refractory metal compound such as WSi (tungsten silicide);

(concerning claim 15)

- forming an insulating film (12) on the light shielding film (11a), inherently, depositing insulating material on the barrier layer.

(claim 16 containing same limitation as the claim 1).

AAPA does not expressly disclose the light shielding film including a metal layer formed of a refractory metal or a refractory metal compound, and a barrier layer (also made of a refractory metal or a refractory compound containing no oxygen) disposed on at least one surface of the metal layer.

However, Komori discloses (Abstract; Fig.1) that the light shielding film is constituted of two layers consisting of the metallic thin film (5) and the light absorbing film (4) so as to eliminate the reflected light from a light shielding film and to generate a sufficient black level. Therefore, Komori shows that using two layers structure of a light shielding film, and one is a metal (no oxygen) and the other one is a light absorbing film.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use two layers structure for the light shielding film for eliminating the reflected light from a light shielding film and achieving a sufficient black level.

Lacking limitation is such that the material of the light absorbing film.

However, Murata discloses (Abstract) that a light absorbing film (opaque film) made of metal. Therefore, the material of the light absorbing film is a metal (no oxygen).

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use two metal layers structure for the light shielding film (barrier layer on the metal layer) as claimed in claims 1, 14, 15-16 and 18 for eliminating the reflected light from a light shielding film and achieving a sufficient black level.

Claims 2 and 3, AAPA (Fig.15) discloses that the light shielding film (11a) being disposed between the substrates (10) and the switching element (TFT 30) and the light shielding film (11a) facing the liquid crystal layer (the electro-optical material).

Concerning the barrier layer disposed on the side facing the switching elements, that is the same limitation described in claim 1 such as the barrier layer disposed on the metal layer and the barrier layer must be facing the TFT; and one of the two metal layers would be barrier layer, such as one metal layer facing the switching element on the other metal layer, and that would have been at least obvious.

6. Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA, Komori and Murata as applied to claims 1-3,14-16 and 18 above, and further in view of JP 63-274929 (Matsushita et al).

Claim 4, lacking limitation is such that the light shielding film including a light shielding metal layer and a light-absorbable metal layer, and the light-absorbable metal layer being disposed on a side facing the switching element.

However, Matsushita discloses (Abstract; Fig.1) that using two layers structure of the light shielding films (4A and 4B), and the metal (such as chromium) light shielding film (4A) having high light shielding rate, and the colored rein layer (4B) mixed with titanium particles (refractory metal compound) preventing the reflection due to the

metallic luster of the metal film, that is to absorb the reflection due to the metallic luster of the metal film. Matsushita discloses (page 3, paragraph 12 – page 4, paragraph 1) that the colored resin film (4B) mixed with carbon, titanium (Ti) (metal) such colored particles, so that the colored particles would absorb light, and that the colored resin film (4B) having the function to absorb light, and that would be a light-absorbable metal layer being disposed on the side facing the switching element. Therefore, the two layers structure of the light shielding film would improve the performance of the light shielding.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use two layers structure of the light shielding film as claimed in claim 4 for achieving high light shielding rate and improving the performance of the light shielding.

Claim 6, AAPA discloses (Fig.15) that the light shielding film (11a) serving to define a display area, because the light shielding film (11a) disposed corresponding to the pixel area. All the limitations in claim 6 are the same as the claim 1, and that would be a redundant claim.

7. Claims 7-10, 17, and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA, Komori and Murata as applied to claims 1-3,14-16 and 18 above, and further in view of US 6,521,913 (Murade).

Claim 7, lacking limitation is such that the light shielding film being connected to a fixed potential.

However, Murade discloses (col.10, lines 23 – 31) that the light shielding film is connected to a constant potential source, that is the light shielding film being connected

to a fixed potential, and with this configuration, the characteristics of the thin film transistor are prevented from being changed and deteriorated due to variation in the electric potential of the light shielding film.

Since the light shielding film being connected to a fixed potential would prevent the characteristics of the thin film transistor changing and deteriorating, because there are no variation in the electric potential of the light shielding film.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the light shielding film being connected to a fixed potential as claimed in claim 7 for preventing the characteristics of the thin film transistor changing and deteriorating.

Claims 8-10, lacking limitation is such that the material of the barrier layer (such as tungsten (W) or (WSi)), and the material of the metal layer (such as Ti).

However, AAPA discloses (paragraph 007) that light-shielding film is formed of WSi (tungsten silicide). The function of the barrier layer is a light shielding, so that the material WSi can be used as the material of the barrier layer.

Furthermore, Murada discloses (col.9, lines 36-45) that the material of the light shielding film is a metallic simple substance such as contains W (tungsten) or Ti (titanium) that are opaque high-melting-point metal (refractory metal), and such that the light shielding film would be prevented from being broken or melted by a high temperature, and the two layers structure of the light shielding film would improve the performance of the light shielding.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a material such as W, WSi or Ti for the material of the barrier layer and the metal layer as claimed in claims 8-10 for improving the performance of the light shielding.

Claim 17, lacking limitation is such that forming insulating film including heat treatment at the temperature from 500° C to 1100° C.

However, Murada discloses (col.25, lines 6-62) that forming the TFT substrate including insulating film under a heat treatment at temperature about 600 to 700° C to perform solid phase growth.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange a heat treatment as claimed in claim 17 for obtaining the phase growth of the films.

Claims 32 and 34, lacking limitation is such that the barrier layers (refractory metal or refractory metal compound containing no oxygen or tungsten) disposed on upper and lower surface of the metal layer, and the thickness of the upper layer being greater than the thickness of the lower layer.

However, Komori discloses (abstract; Fig.3) that the light absorbing film (4) (functions as barrier layers, because the light absorbing film having function to absorb light) formed on upper and lower surfaces of the metallic film (5) (the metal film '5' is formed by sandwiching both sides of the metal film '5' with the light absorbing film '4', and the light shielding film formed by making combination use of the metal film and the light absorbing films (barrier films) would obtain a sufficient light shielding effect and

decreasing the reflected light and eliminating the transmitted light. Making thickness of the upper barrier layer greater than the thickness of the lower barrier layer as Komori disclosed (abstract) that the influence of the liquid crystal layer on orientability would be reduced, since the upper barrier layer facing the side of the liquid crystal layer.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange upper barrier layer and lower barrier layer as claimed in claims 32 and 34 for obtaining sufficient light shielding effect, decreasing the reflected light, eliminating the transmitted light, and less influence of the liquid crystal layer on orientability.

Claim 33, lacking limitation is such that the barrier layers being formed of tungsten.

However, Murada discloses (col.9, lines 36-45) that the material of the light shielding film is a metallic simple substance such as contains W (tungsten), and that is opaque high-melting-point metal (refractory metal), such that the light shielding film would be prevented from being broken or melted by a high temperature. The barrier layers having light shielding function, so that the material of tungsten as opaque high-melting-point metal (refractory metal) is used for preventing from being broken or melted by a high temperature.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange upper barrier layer and lower barrier layer as claimed in claim 33 for preventing from being broken or melted by a high temperature.

Response to Arguments

8. Applicant's arguments filed on Jan. 7, 2004 have been fully considered but they are not persuasive.

Applicant's arguments are as follows:

1) The references do not teach the barrier layer formed of a refractory metal or refractory metal compound containing no oxygen.

Examiner's responses to Applicant's arguments are as follows:

1) The reference Komori teaches that using two or three metal layers (containing no oxygen) to constitute the light shielding film, and obtaining sufficient light shielding effect. The reference Murada teaches that light shielding film using high-melting-point metal (refractory metal) to constitute light shielding film to prevent from being broken or melted by a high temperature.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

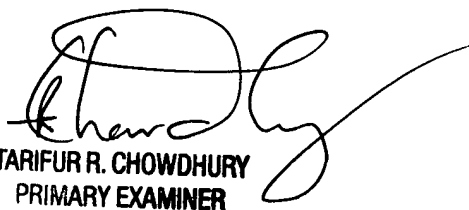
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299. The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2871

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi
August 23, 2004



TARIFUR R. CHOWDHURY
PRIMARY EXAMINER